

# Work Order ID 57532

Thursday, April 08, 2010 8:19:47 AM

Page 1

Item ID: D412-664-203

Accept

Setup Start

Revision ID:

Item Name: Crosstube Aft

Stop

Start Date: 4/9/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 4/30/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals:

Process Plan: *mf*

Date: *10-4-8*

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D412-664-243

E

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D412-664-203 CHG 006

*8.0/05/05*

*HJ for BG 10/05/05*

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

*(IX) MB 10-04-26*

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

*(IX) MB 10-04-26*

*57532 D412-664-203*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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• **NOTE:** Date & initial all entries

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Date:

Tooling:

Date:

Run Start



QC:

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Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

8/10/04/26



140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551

2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-SCRIBE PART # & BATCH #

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

MB  
10-04-26

AWM  
10-4-29

W/O:		WORK ORDER CHANGES					
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Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

1 - - AWM  
10-4-29

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

8/04/29

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8/04/29

4

W/O:		WORK ORDER CHANGES					
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**Setup Start**

**Item Name:** Crosstube Aft

**Stop**

**Cust Item ID:**[illegible]

**Customer:**

**Reference:**

**Approvals:**      **Process Plan:** \_\_\_\_\_      **Date:** \_\_\_\_\_      **Tooling:** \_\_\_\_\_      **Date:** \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

**Stop**



**Insp.  
Stamp**

0.00



## Memo

0.00

Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: 11736 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

CL 10/4/29 (1)

0.00



## Memo

0.00

Inspect for transit damage  
Ensure copy of NDT results attached to work order.

P10/4/30 C

0.00



## Memo

0.00

Inspect for damage & ensure results are as per Dwg D412-664-203

ml 10 04 30 (1)

W/O:		WORK ORDER CHANGES					
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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: <u>7:30</u> Finish Time: <u>8:30</u> PAINT: Start Time: <u>12:30</u> Finish Time: <u>1:30</u>								
220	QC14- Inspect Spray Paint	0.00							
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								

M 10 04 30 (1)

ET 1005-03

W/O:		WORK ORDER CHANGES					
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Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date:

Tooling:

Date:

Stop

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

230

0.00



Crosstubes

MA 10 05 03 ①

Crosstubes

Memo

0.00

Crosstubes

Assemble as per Dwg D412-664-203

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: 114021

Expiry Date: 01/2011

3-Install clamps as per Dwg D212-664-203 using installation jig DT9024 with 0.010 thick brass shims on both chafing sheild (D3189-1). Torque clamps to 80-100 in lb. ML 10.05.04

240

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

81065105

④

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	---------------

250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-5-5

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

8.06/05

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D412-664-203

\*\*\*\*\*Ensure tube is not packaged if curing time is less than 12 hrs, see step 27  
for application time & date \*\*\*\*\*

Time &amp; date of packaging: 11:00am on 10/05/05

Location: \_\_\_\_\_

New H

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals:

Process Plan: \_\_\_\_\_

Date: \_\_\_\_\_

Tooling: \_\_\_\_\_

Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_

Date: \_\_\_\_\_

SPC (Y/N): \_\_\_\_\_

Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

10/05/06

BS10-5-06

①

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
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# Picklist Print

Thursday, April 08, 2010 8:19:47 AM

Page 1

Work Order ID: 57532

Parent Item: D412-664-203

Parent Item Name: Crosstube Aft

Comments: IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS  
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM  
 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM

Start Date: 4/9/2010

Required Date: 4/30/2010

Start Qty: 1.00

Required Qty: 1.00

D412-664-203TRN Manufactured No 110 Each 0.0000 1.0000



Crosstube Turning Detail

D2856-600 Manufactured No 230 f 272.2300 1.7600



Abrasion Strip

B-57346 MB 10-04-26

10-05-03

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST403

272.23

25656

1.25

26650

2.5

36398

32.48

37668

236

D2896-1 Manufactured No 230 Each 23.0000 1.0000



Support

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

LG

23

43209

3

47820

20

10-05-03

W/O:		WORK ORDER CHANGES					
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Start Date: 4/9/2010

Required Date: 4/30/2010

Comments:

IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS  
 IPP Rev:F 06-03-29 Remove Comments on Pick List JLM  
 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM

Start Qty: 1.00

Required Qty: 1.00

D3189-1

Manufactured No

230

Each

34.0000

2.0000



Chafing Shield

## Warehouse

## Loc Qty

## Loc Code

### Location

OFFSHORE

FG

2

36065

2

Main Warehouse

LG

32

52446

12

56353

20

*MW 10 05 03*

D3595-063-570

Manufactured No

230

Each

31.0000

4.0000



RUBBER CUSHION

## Warehouse

## Loc Qty

## Loc Code

### Location

OFFSHORE

FG

4

37971

4

Main Warehouse

LG

27

45509

27

*MW 10.05.03*

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Shop Packet Print

Page 2

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 IPP Rev:G 06.12.08 per ECN 886 EC  
 IPP Rev:H 07-04-30 As per Rev D JLM

Start Qty: 1.00

Required Qty: 1.00

MS21920-28 Purchased No 230 Each 99.0000 4.0000



Clamp(per MIL-DTL-8783C)

Warehouse Loc Qty Loc Code

Location

OFFSHORE

FG

5

105884

5

Main Warehouse

LG

94

112624

2

112863

50

113776

42

*ms 10.05.03*

MS21920-30 Purchased No 230 Each 132.0000 2.0000



clamp(per MIL-DTL-8783C)

Warehouse Loc Qty Loc Code

Location

Main Warehouse

LG

132

109181

36

111258

50

112772

46

*ms 10.05.03*

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Shop Packet Print

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**Dart Aerospace Ltd**

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 IPP Rev:H 07-04-30 As per Rev D JLM

Start Date: 4/9/2010

Required Date: 4/30/2010

Start Qty: 1.00

Required Qty: 1.00

AN6-40A

Purchased No

250 Each

85.0000 4.0000



Bolt

10-5-52

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST343

85

112828

50

113422

35

AN6-41A

Purchased No

250 Each

84.0000 2.0000



Bolt

10-5-52

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST344

84

112489

9

112805

25

113288

50

AN960JD616

Purchased No

250 Each

157.0000 18.0000



Washer

10-5-52  
M113524

## Warehouse

## Loc Qty

## Loc Code

### Location

Main Warehouse

ST347

157

113149

157

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IPP Rev:H 07-04-30 As per Rev D JLM

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

250

Each

281.0000 6.0000

Nut



10-5-5 SP

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST300

281

-111578

281

6

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Shop Packet Print

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

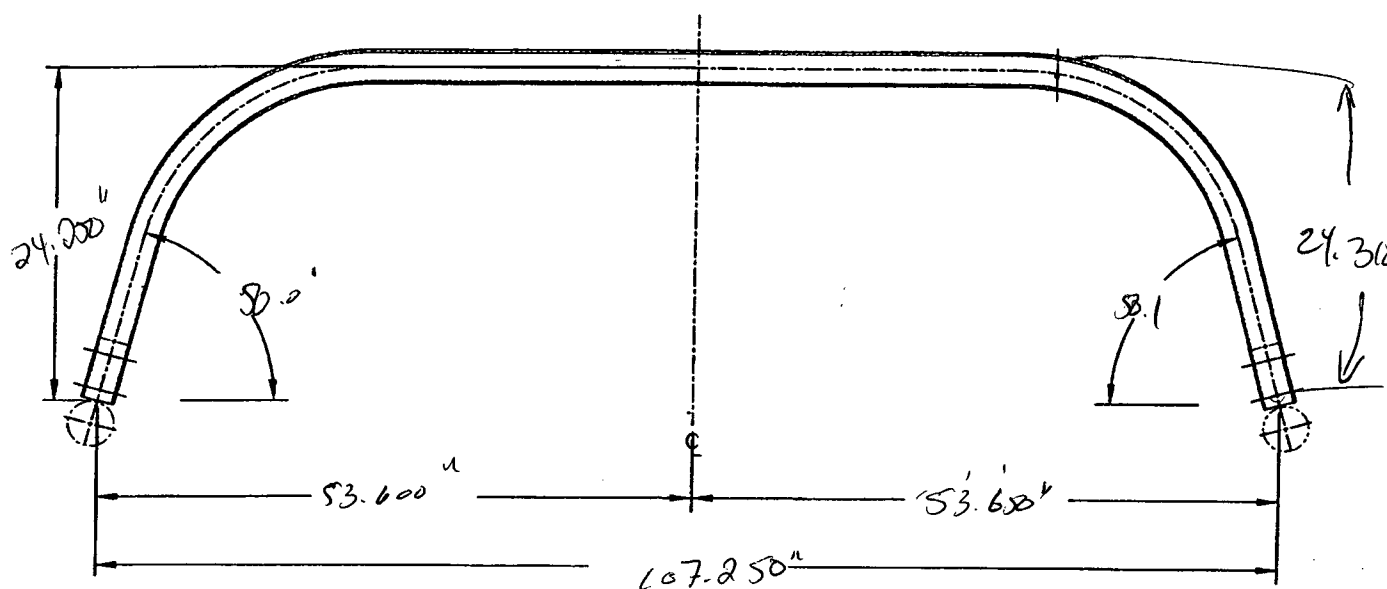
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b>	57532
<b>Description:</b> Crosstube High.Aft (412)		<b>Part Number:</b>	D412-664-203
<b>Inspection Dwg:</b> D412-664-243 <b>Rev:</b> E		<b>Page 1 of 1</b>	

Required Dimension	Min	Max
Height	24.24	24.50
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70



Comments

QC15 Inspection	S
Date	12/04/26

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Item	Qty	Part Number	Description
	-243		
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
6	2	D2856-600-1009	ABRASION STRIP
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6009-129  
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D412-664-243" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 47.0 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2896-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) INSTALL D2856-600-1009 ABRASION STRIPS WITH A 0.13 REF GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 15) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 16) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

#57532

**RELEASED**  
2009-10-29

E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 06-046 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. E
CHECKED	PH	D412-664-243	SHEET 1 OF 4
MFG. APPR.	PH	TITLE	SCALE
APPROVED	PH	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DE APPR.	PH	DATE 09.09.30	

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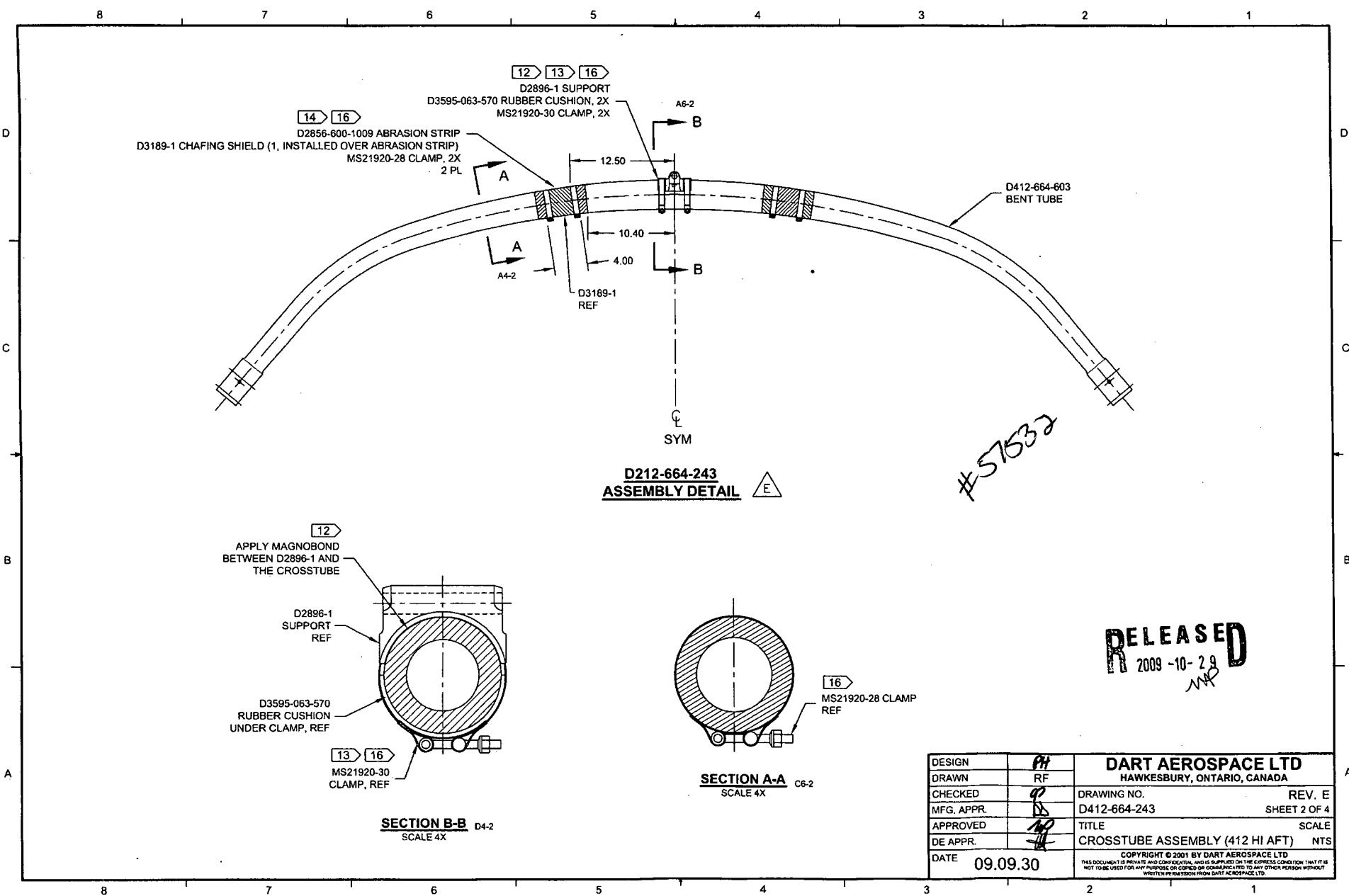
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



DESIGN	PH	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	Q	DRAWING NO.	REV. E
MFG. APPR.	Q	D412-664-243	SHEET 2 OF 4
APPROVED	Q	TITLE	SCALE
DE APPR.	Q	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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# Dart Aerospace Ltd

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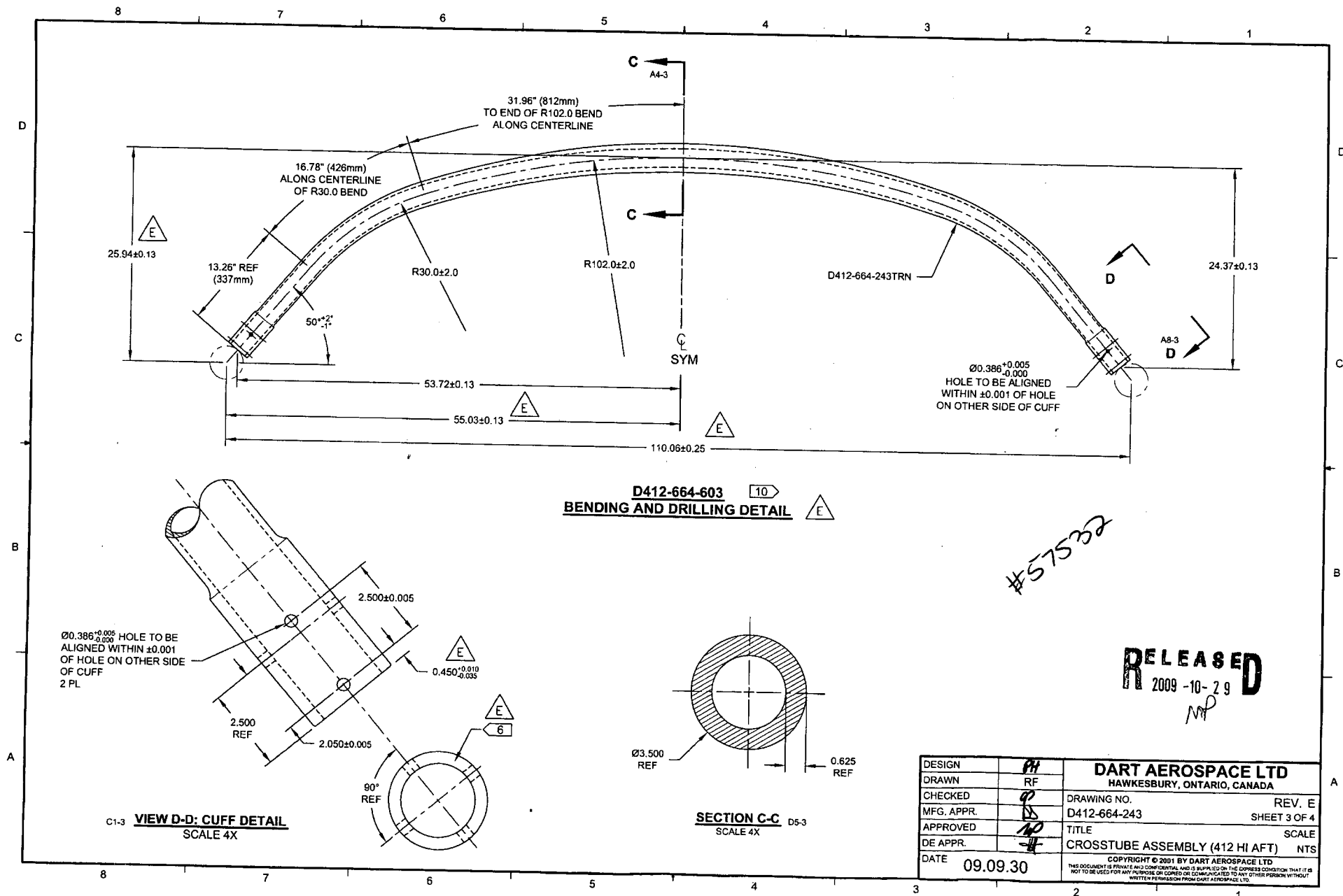
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NOTE: Date & initial all entries





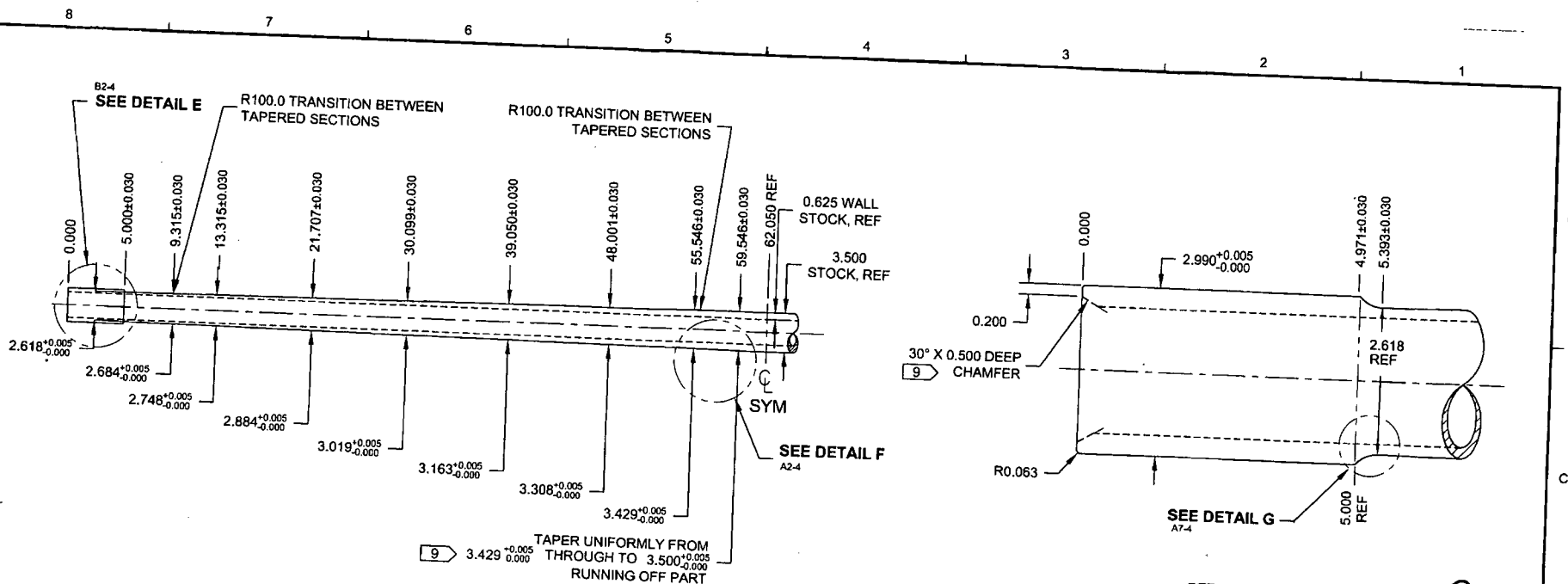
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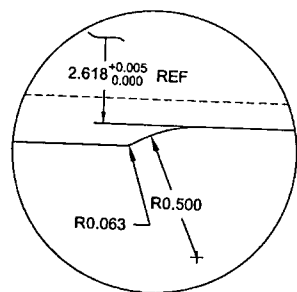
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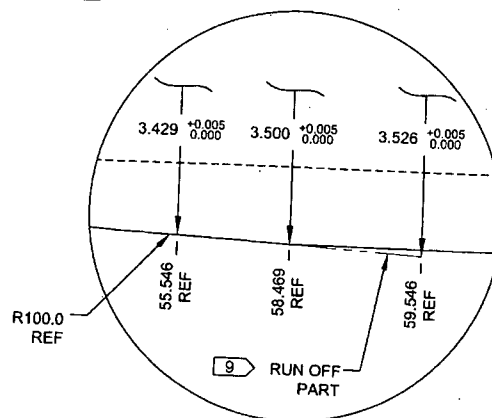
**NOTE:** Date & initial all entries



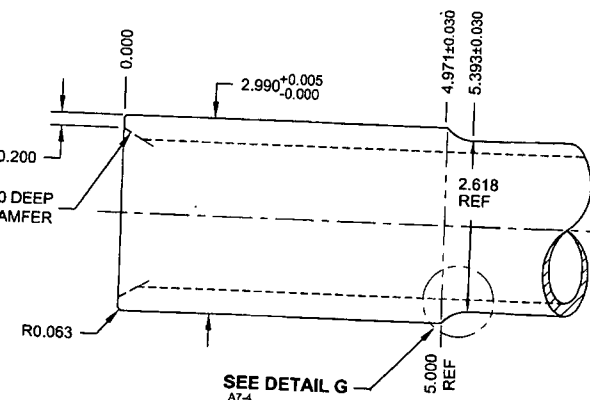
**D412-664-243TRN**  
**TURNING DETAIL**



**DETAIL G:**  
**CUFF TRANSITION**  
SCALE 10X



**DETAIL F:**  
**TAPER RUN-OFF**  
NOT TO SCALE



**DETAIL E:**  
**CROSSTUBE CUFF**  
SCALE 5X

**RELEASED**  
2009-10-29

DESIGN	PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	9	DRAWING NO.	REV. E
MFG. APPR.	18	D412-664-243	SHEET 4 OF 4
APPROVED	10	TITLE	SCALE
DE APPR.	11	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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**NOTE:** Date & initial all entries

REFERENCE ONLY

## 5.0 PARTS LIST

## 5.1 HIGH GEAR CROSSTUBES

Item	-101	-201	-203	Part Number	Description
	X			D212-664-101	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
		X		D212-664-201	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
			X	D412-664-203	CROSSTUBE INSTALLATION, 412 HIGH AFT
1	1			D212-664-141	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD
2		1		D212-664-241	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT
3			1	D412-664-243	CROSSTUBE ASSEMBLY, 412 HIGH AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
50	1	1		D3428-1	PLACARD

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/241 OR D412-664-243 ASSEMBLIES ABOVE  
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA  
CROSSTUBES.

W/O:		WORK ORDER CHANGES						
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## LIQUID PENETRANT TEST REPORT

P- 05484

CLIENT DART AEROSPACE DATE April 29/2010 PAGE 1 OF 1  
ATTENTION LINDA MACLE CHANTINE/IAN ACUREN JOB NO. 188-10-0673 TIME AM ☒ PM ☐  
ADDRESS 1270, ABERDEEN ST. POWO No. 111786  
HAWKESBURY, ON WORK LOCATION AS ADDRESS  
PROJECT FP 1 ON 4 X "CROSS TUBE" ACCEPTANCE STD. ASTM 1417/AST 038 REV./DATE 2008  
ITEM(S) EXAMINED JOB # SEE W.O. # BELOW  
SCOPE PERFORMED A "WET-FLUORESCENT-LIQUID PENETRANT" INSPECTION ON 100% OF THE EXTERNAL SURFACE

TEST DETAILS  
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED  
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 13798 ☒ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☒ AMBIENT < 2 fc  
PENETRANT 2K-67 MINIMUM DWELL TIME 10 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE  
PENETRANT REMOVER WATER MINIMUM DRY TIME > 10 MIN. OTHER  
DEVELOPER SKD-S2 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE May-10-2010  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY  
TEST SURFACE  
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F  
RESULTS- ☐ METRIC ☒ IMPERIAL

-WET FLUO L.P.I. ON 100% EXT. SURF

- 1 CROSS TUBE W.O. ID 58172 ✓
- 2 CROSS TUBE W.O. ID 58173 ✓
- 3 CROSS TUBE W.O. ID 58174 ✓
- 4 CROSS TUBE W.O. ID 57532 ✓

"CROSS TUBE"

ITEM ID.: - D212-664-101 (ITEMS #1 & 2)  
- D412-664-203 (ITEMS #3 & 4)

70-04 301

NO REJECTABLE INDICATION WAS DETECTED AS PER APPLICABLE STANDARD

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE Ben Tillet PRINT SIGNATURE [Signature] DTR # E48626  
TECHNICIAN (SIGNATURE): [Signature] REPORT REVIEWED BY:  
NAME (PRINT): Vives Desrosiers 1<sup>st</sup> TECHNICIAN 2<sup>nd</sup> TECHNICIAN  
CGSB LEVEL 2 SNT LEVEL 2 CGSB LEVEL 1 SNT LEVEL 1  
CGSB REG. NO. 3049 CGSB REG. NO. 1

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